

Jianjin Xu

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EDUCATION

Columbia University

M.S. in Computer Science

Thesis: Semantic Controllable Image Generation in Few-shot Settings

Advisor: Prof. Changxi Zheng

New York, NY

8/2019 – 5/2021

Tsinghua University

B.Eng. in Computer Science

Thesis: Training GANs with the Sunway Taihulight Supercomputer

Advisor: Prof. Guangwen Yang

Beijing, CN

8/2015 – 7/2019

EMPLOYMENT

Carnegie Mellon University

Research Assistant, supervised by Prof. Fernando De La Torre Frade

Pittsburgh, PA

8/2022 –

Tsinghua University

Research Assistant, supervised by Prof. Xiaolin Hu

Beijing, China

8/2021 – 08/2022

RESEARCH INTERESTS

Generative Models, 3D Generative Modeling, Neural Network Interpretation

PUBLICATIONS AND MANUSCRIPTS

Extracting Semantic Knowledge from GANs with Unsupervised Learning

[\[project page\]](#)

Jianjin Xu, Zhaoxiang Zhang, Xiaolin Hu

Submitted to IEEE Transactions on Pattern Analysis and Machine Intelligence.

Linear Semantics in Generative Adversarial Networks

[\[paper\]](#)[\[project page\]](#)

Jianjin Xu, Changxi Zheng

Conference on Computer Vision and Pattern Recognition 2021 (CVPR 2021).

Frame Difference-Based Temporal Loss for Video Stylization

[\[paper\]](#)[\[project page\]](#)

Jianjin Xu, Zheyang Xiong, Xiaolin Hu

ArXiv preprint.

RESEARCH EXPERIENCE

Fast Inpainting by Inverting Diffusion Models

07/2022 –

Research Assistant at CMU, supervised by Prof. Fernando De La Torre Frade

In progress

- Studied the inversion behavior of several sampling algorithms and proposed a fast diffusion-based inpainting algorithm, which brings around 10x acceleration compared to DDRM (2022/8).
- Presented the first personalized face inpainting application (preserve the identity of inpainted image given several reference images) on diffusion models.

Extracting Semantic Knowledge from GANs with Unsupervised Learning

6/2021 – 05/2022

Research Assistant at Tsinghua University, supervised by Prof. Xiaolin Hu

Submitted to TPAMI

- Proposed KLiSH (K-means with Linear Separability Heuristic) to cluster GAN's features by leveraging GAN's linear semantics.
- Realized unsupervised fine-grained segmentation and unsupervised semantic-conditional synthesis on various datasets, which are both unattainable with previous methods.

Linear Semantics in Generative Adversarial Networks

6/2020 – 11/2020

Columbia University, supervised by Prof. Changxi Zheng

Accepted by CVPR2021

- Discovered and empirically proved that semantic classes learned by GANs are linearly separable.
- Constructed a linear transformation to extract semantics from GAN's features and showed that it achieved close performance to nonlinear transformations on various GANs.
- Proposed two few-shot image editing applications: semantic-conditional sampling and semantic image editing.

Neural Painter: Smart Image Editing with Simple Line Drawings

10/2017 – 4/2018

Tsinghua University, supervised by Prof. Xiaolin Hu

- Led a team to build an image editing application capable of editing anime faces guided by simple color strokes.
- Implemented the core GAN modules and coordinated dataset filtering, UI design, and backend development.
- [\[project page\]](#)

Frame Difference Based Temporal Loss for Video Stylization

6/2017 – 11/2018

Tsinghua University, supervised by Prof. Xiaolin Hu

- Proposed to use frame difference measured on pixel and feature space as a loss to stabilize stylized videos. Compared to the optic flow-based loss baseline, the proposed loss matches the baseline's performance while it is faster and avoids estimating the entire dataset's optic flow.
- Developed an experiment system for evaluation and hosted experiments involving 62 subjects and 25,600 votes.

Unrestricted Vehicle Re-Identification System with Deep Metric Learning

6/2018 – 10/2018

Internship at MSRA, supervised by Lead Researcher Xun Guo

- Developed a re-identification system that inputs raw videos of monitors and identifies re-appeared vehicles. The system first detects vehicles by faster RCNN, then conducts tracking and matching by learned deep metrics.
- Trained the deep metric model on VeRi dataset and validated it on VID dataset and collected traffic videos.

SELECTED PROJECTS

Optional Depth Pathway for Mask-RCNN

10/2019 – 1/2020

Robotic Learning, supervised by Prof. Shuran Song

- Proposed to enhance Mask-RCNN with the ability to take in depth modality optionally such that Mask-RCNN can be trained with both RGB and RGB-D datasets to improve its performance.

Interactive Editing in Aesthetic Painting Generation System

5/2018 - 6/2018

Professional Practice, supervised by Prof. Jia Jia

- Enabled interactive segmentation and image editing using GrabCut, image inpainting using GANs and image fusion using poisson image editing.
- [\[project page\]](#)

Weakly Supervised Object Localization with LRP

10/2017 – 4/2017

Student Research Training, supervised by Prof. Xiaolin Hu

- Proposed to use the network visualization results obtained with Layerwise Relevance Propagation for weakly supervised object localization.

A CUDA/GPU Accelerated Spiking Neural Network Simulator

4/2016 – 7/2016

Student Research Training, supervised by Prof. Feng Chen

- Implemented a Spiking Neural Network simulator using CUDA and accelerated the simulation for around 20 times on GPU compared to CPU.

AWARDS

3rd Prize in 36th the Challenge Cup Competition, Tsinghua University

4/2018

2nd Prize in Mathematical Contest in Modeling, 2017

2/2017

TEACHING EXPERIENCE

TA @ Columbia University, COMS-W4995 Special Topics In Computer Science, I: Causal Inference, 2020

MISCELLANEOUS EXPERIENCE

Chairman of Tsinghua Microsoft Student Club

6/2018-6/2019

SKILLS

pytorch / tensorflow / python / C++ / javascript / CUDA